

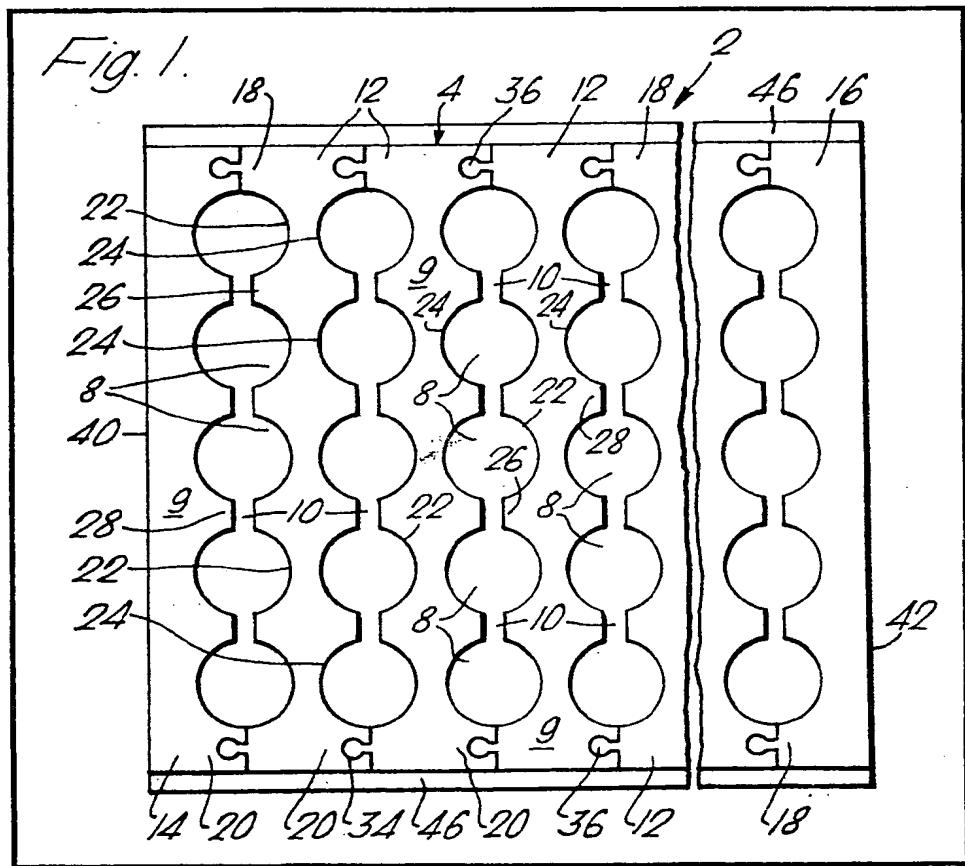
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**(54) Holder for holding a plurality of items**

(57) A holder (2) for storing a plurality of items, e.g. test-tubes, has a plurality of holes (8) extending thereinto from a top surface (9) of the holder. The holder is made of a number of elements (12, 14, 16) arranged side-by-side and interconnected by interlocking projections (36) and recesses (34). Each element (12, 14, 16) is provided with recessed portions (22, 24) which co-operate with portions in adjacent elements to form the holes (8). Preferably, the elements are formed by an extrusion process. In a further embodiment, made by moulding, each element has an identical combination of projections and recesses on each side and the recessed portions forming the holes have integral bottoms to them.

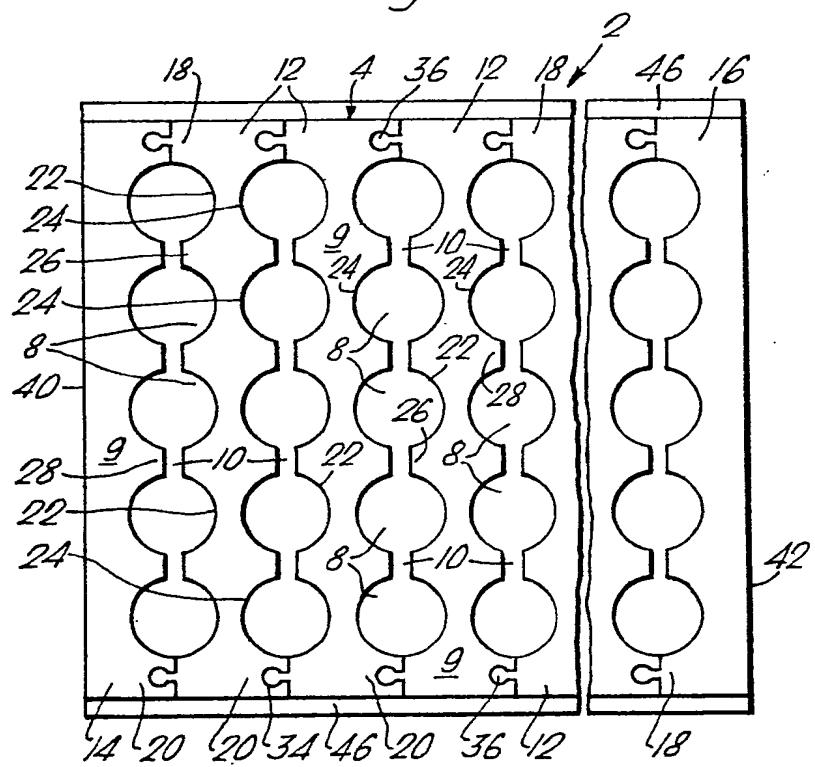


The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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Fig. 1.



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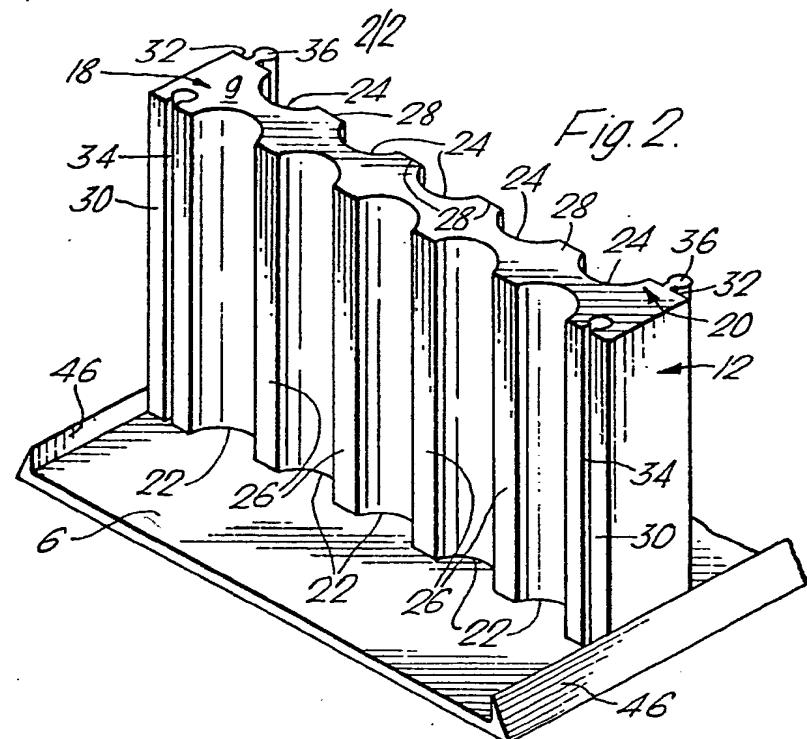
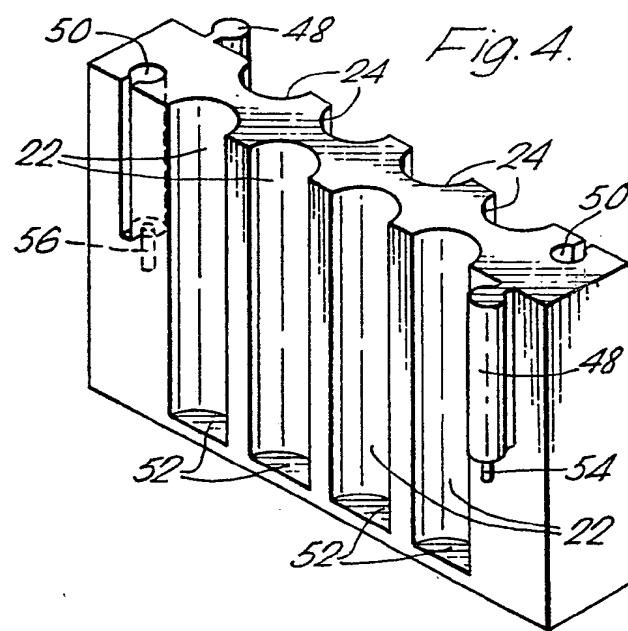
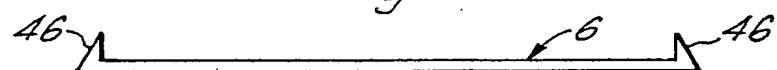


Fig. 3.



## SPECIFICATION

## Holder for holding a plurality of items

5 This invention relates to holders in which a plurality of items can be kept. The invention is particularly concerned with the type of holder which comprises a member having a plurality of openings extending thereinto from a top 10 surface thereof, each for receiving one of said items.

One such type of holder which is presently in use is formed of a rubber block having a rectangular array of cylindrical, elongate holes 15 extending downwardly from the top surface. These holders are primarily used for supporting laboratory equipment, such as test tubes, ampoules, bottles etc. Such holders are marketed in various forms, having different numbers of holes and different hole diameters, so 20 as to satisfy varying requirements. The holders may be arranged resiliently to grip the items supported thereby in the holes.

In accordance with the invention, a holder 25 for holding a plurality of items comprises a member having a plurality of openings extending thereinto from a top surface thereof, each opening being arranged to receive one of said items, wherein the member comprises a 30 number of elements arranged side-by-side with adjacent ones thereof interconnected by interengaging projections and recesses.

Preferably at least those elements not at the 35 ends of the holder have identical projection/recess arrangements. This simplifies the manufacture of the holder, and also enables holders of different lengths to be constructed using different numbers of the same elements.

In the first embodiment to be described 40 below, each element has projections on one side and recesses on the other side. In this case, the minimum number of elements required to construct the holder, assuming it is to have flush ends, would be three, namely, 45 one type of middle element and two different types of end elements, one type being formed with recesses and the other type being formed with projections.

In the second embodiment which will be 50 described, at least those elements not at the ends of the holder each have the same projection/recess arrangement on both sides thereof. In this manner, the minimum number of types of elements required to form a flush-ended holder is reduced to two, because the 55 end-type elements can be identical for both ends.

The elements may each be provided with recessed portions in one or both sides, the 60 portions co-operating with other portions in the adjacent side of another element to form the openings for receiving the items. The parts of the sides of the element between adjacent recessed portions may be set back 65 with respect to the end of the element, so that

gaps are formed between adjacent holes. Such gaps aid in allowing the member to deform sufficiently with an item sized so that it is securely gripped by the member is inserted in a hole.

It will normally be required for the bottoms of the item-receiving openings to be closed to prevent items from slipping through. This may be achieved by providing a separate base 75 element which closes the bottoms of the openings in the other elements. However, it is preferred that the bottoms of the item-receiving openings should be formed integrally with the elements, for example as in the second 80 embodiment to be described, because this enables the number of element types required for forming a flush-ended holder with closed bottoms to its openings to be kept at two. Of course, if flush ends were not required, only 85 one element type would be required to form a complete holder.

In a further embodiment, each element has a constant horizontal cross-section, so that the elements can be formed by extrusion followed 90 by severance to desired length, thus making the manufacture of the holder considerably cheaper.

The elements may be formed of natural or synthetic rubber or other rubber like materials, 95 or plastics material such as PVC or polypropylene, depending upon the desired hardness and properties of the holder.

By varying the lengths of the elements cut from extruded plastics material, the depths of 100 the holder and the holes therein can be altered. Also, elements may be produced with different colours, and with differently sized recessed portions so as to form differently sized holes.

105 Thus it is possible to produce holders of different hardnesses, colours and depths and different diameter holes, to suit various items. Furthermore, according to a preferred feature of the invention, the various elements used to 110 construct the different holders are mutually compatible, in that different elements can be interconnected to form a holder.

Thus, a single holder may have, at different 115 positions along its length, different colours and/or different sized holes, etc. A user can therefore choose or construct a single holder capable of storing different items, and if desired, having different colours to classify the various items.

120 Arrangements embodying the invention will now be described by way of example, with reference to the accompanying drawings, in which:

125 *Figure 1* is a plan view of a test-tube holder in accordance with the invention;

*Figure 2* is a perspective view of an element of the holder of *Fig. 1*;

*Figure 3* is an end view of the base of the holder, and

130 *Figure 4* is a perspective view of an element

of a further form of holder in accordance with the invention.

Referring to Figs. 1 to 3, the test-tube holder 2 comprises a composite member 4 supported on a base 6. The member 4 has a rectangular array of openings in the form of holes 8, the holes in each row being interconnected by gaps 10. The holes 8 are cylindrical and extend vertically through the entire height 10 of the member 4 from the top surface 9 thereof.

The member 4 consists of a plurality of identical elements 12, and two end elements 14 and 16, arranged side-by-side along the 15 length of the member. Each of the elements 12, 14 and 16 has a constant horizontal cross-section, and has been formed by extruding plastics material and cutting the latter into appropriate lengths.

20 Each of the elements 12 has opposite sides 18 and 20. Each of the sides 18 and 20 is formed with five vertically extending, semi-cylindrical recessed portions 22 and 24 respectively. The recessed portions 22 in the 25 elements 12, together with recessed portions 24 in respective adjacent elements, form the holes 8.

The web portions 26 and 28 intermediate adjacent recessed portions 22 and 24 respectively are set back with respect to the ends 30 and 32 of the sides 18 and 20 respectively. This produces the gaps 10 interconnecting the holes 8 of each row.

35 Each of the sides 18 of the elements 12 is provided, at its ends 30, with two recesses 34. Each recess extends vertically through the element, and has a relatively wide base and narrow opening.

The sides 20 are provided with projections 40 36, one at each end 32, the projections having shapes corresponding with the shapes of the recesses 34.

45 As can be seen from Fig. 1, when assembled the projections 36 are fitted into the recesses 34 so as to hold the elements together. This can be achieved simply by sliding the projections 36 of each element vertically downwardly into the recesses 34 of the adjacent element, or, if the elements are sufficiently resilient, by pushing the projections laterally into the recesses.

50 The end element 14 of the member has a size 20 corresponding with the sides 20 of the elements 12, and a flat surface 40 at the 55 opposite side in place of the sides 18 of the elements 12. Correspondingly, the element 16 has a side 18 similar to the sides 18 of the elements 12, and a flat surface 42 in place of the side 20.

60 The base 6 has an upwardly extending lip 46 at each of its sides to retain the member 4. If desired, the lips could be made higher, and pegs provided for insertion into aligned holes in the lips and elements firmly to secure 65 the base to the member.

The elements are preferably made of plastics material by an extrusion process. The base 6 may also be made in this manner. The material may be PVC, or polypropylene which 70 has the advantage that it can be sterilised by autoclaving. Also, the use of plastics material sometimes avoids the problem of vulcanization usually necessary when making rubber holders. Nevertheless, the elements could if 75 desired be made of natural or synthetic rubber, or other material, and using other processes, e.g. injection moulding.

If desired, each element may be provided with only one, or more than two, projections 80 and/or recesses on each side. The illustrated arrangement of these may be modified so that each of the sides has both a recess and a projection, as in the further embodiment described below.

85 If desired, adhesive may be used in securing the elements together.

Although the holder has been described as being useful for laboratory equipment, particularly test-tubes, different sized holders may be 90 constructed for supporting other items, for example beer bottles, milk bottles, jars, etc.

The holder may be sold in its completed form, or in the form of separate elements for assembly by the user. The latter procedure 95 has the advantage that less storage space is required. As indicated above, the height of the elements, and hence the depth of the holes 8, can be varied, as can be the diameter of the holes and the colour of the elements.

100 The length of the holder can be altered simply by including more or less elements. Using combinations of different, compatible elements, the structure of the holder can be made to suit the user's requirements.

105 It will be appreciated that, if desired, the holder can comprise an array of elements, with parallel side-by-side rows each comprising a number of side-by-side elements.

Fig. 4 shows a further type of element for 110 use in constructing a holder. It will be apparent that it has many characteristics in common with the type of element already described, so only the significant differences will be referred to in detail.

115 In this embodiment, the projection/recess arrangements on the opposite sides of the elements are identical, that is to say, whichever side the element is viewed from there is a projection 48 adjacent its right hand end

120 and a recess 50 adjacent its left hand end. Consequently, if it is desired to provide special end elements for finishing the ends of a holder, only one type of such element need be provided, this having the same arrangement of a projection 48 and a recess 50 as is shown on the middle-type element illustrated in Fig. 4. Identical such end elements can then be fitted at each end of a holder comprising a series of middle-type elements.

130 The element as shown in Fig. 4 is also

formed with integral bottoms 52 for its recessed portions 22 and 24. In this way, the need for a separate base 6 is avoided so that only one type of component is absolutely essential for forming a holder, namely a middle-type component as shown in Fig. 4. If special ends are required, the minimum number of components is two, but of course this still represents a substantial advantage as compared with the first embodiment described. Owing to the integral bottoms 52, however, the embodiment of Fig. 4 cannot be produced by extrusion but should be produced by moulding.

15 A further characteristic of the embodiment in Fig. 4 is that the projections and recesses 48 and 50 are present only in the upper part of the element. They are, of course, of equal dimensions in the vertical direction. The projections 48 are formed with integral pegs 54 at their lower ends which firmly engage into sockets 56 formed in the lower end walls of the recesses 50 when adjacent elements are being joined together. Firmness of engagement may be improved by having an enlargement or lateral projection at the end of each peg 54 and a co-operating recess at the end of each bore 56 to enable the pegs and sockets to become locked together after being pushed into engagement.

30 The sizes of the projections 48 and recesses 50 will of course be selected to provide the required amount of strength in the assembled holder, and in fact in Fig. 4 they are shown as being of greater cross-sectional size relative to the remainder of the elements than are the projections and recesses 36 and 34 in Figs. 1 and 2.

35 It should be appreciated that if desired that elements of the kind shown in Fig. 4 could be manufactured by extrusion if the integral bottoms 52 too were omitted and if the projections 48 and recesses 50 were to extend throughout the whole height of each element. 45 To provide a holder with closed bottoms to its item-receiving recesses and with special ends would then require a minimum of three component types i.e. one type of end component, one type of middle component and a bottom 50 or base component.

55 It will be appreciated that the modifications and advantages referred to above in connection with the embodiment shown in Figs. 1 to 3 also apply to the embodiment illustrated by Fig. 4.

#### CLAIMS

1. A holder for holding a plurality of items, comprising a member having a plurality 60 of openings extending thereinto from the top thereof, each opening being for receiving one of said items, wherein the member comprises a number of elements arranged side-by-side with adjacent ones thereof interconnected by 65 interchanging projections and recesses.

2. A holder as claimed in claim 1, in which at least those elements not at the ends of the holder have identical projection/recess arrangements.

70 3. A holder as claimed in claim 1 or claim 2, wherein at least those elements not at the ends of the holder each have the same projections/recess arrangement on both sides thereof.

75 4. A holder as claimed in claim 3, wherein those elements not at the ends of the holder each have on each side, a recess at or near one end and a projection at or near the other end, the recess on one side being at or near 80 the same end as the projection on the other side.

5. A holder as claimed in any preceding claim, wherein the projections and recesses are present only in the upper portions of the 85 elements.

6. A holder as claimed in any preceding claim, wherein the openings are formed by co-operating recesses in adjacent sides of adjacent elements.

90 7. A holder as claimed in any preceding claim, wherein bottoms of said item-receiving openings are formed integrally with said elements.

8. A holder as claimed in claim 7, wherein 95 dependent directly or indirectly on claim 3, wherein said member consists of only two types of elements, namely one or more middle-type elements each having said same projection/recess arrangement on both sides and 100 at each end an end-type element having on one side the same projection/recess arrangement as on a middle-type element.

9. A holder as claimed in any of claims 1 to 6, wherein each said element has a constant cross-section in the horizontal plane and 105 is formed by extrusion followed by severance to desired length.

10. A holder as claimed in any one of claims 1 to 5 or claim 9, wherein the elements 110 are secured to a base which forms bottoms for said item-receiving openings.

11. A holder as claimed in claim 10, wherein said base is formed by extrusion followed by severance to desired length.

115 12. A holder as claimed in any preceding claim, wherein the elements are of natural or synthetic rubber or other rubberlike material.

13. A holder as claimed in any one of claims 1 to 11, wherein the elements are of 120 plastics material.

14. A holder as claimed in claim 7 or claim 8, where the elements are formed by moulding.

15. A holder as claimed in any preceding 125 claim, wherein openings of different sizes are defined in or between different elements.

16. A holder as claimed in any preceding claim, wherein different elements are made from materials of different hardnesses.

130 17. A holder as claimed in any preceding

claim, wherein different elements are of different colours.

18. A holder as claimed in any preceding claim, wherein different elements have different heights.

19. A plurality of parts from which a holder according to any of the preceding claims can be assembled.

20. A holder substantially as hereinbefore  
10 described with reference to Figs. 1, 2 and 3,  
or Fig. 4, of the accompanying drawings.

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